Network Working Group
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Two Protocol Suggestions to Reduce Congestion at Swap-Bound Nodes

There is a wide variance in swap rates between core and auxiliary store among the HOST systems to be nodes in the ARPA IMP network. The slower of these, of which our 360/50 system with 2303 drum swap store is an example, might improve the utility of the network not only for themselves but for all nodes if the two protocol suggestions of this note were to be adopted.

1. HOST control of ordering of IMP-to-HOST traffic. IMP-HOST protocol now calls for delivery of messages from IMP to HOST in the order in which the IMP received them. This may lead to wasted swapping if, for example, the IMP has messages for its HOST's timeshare users A and B, in that order, at a time when user B is in HOST core. B would have to be swapped out, A in, and the first message accepted--only to discover that now A must be swapped out and B back in again. If the HOST could a) read the IMP's queue of waiting messages and b) accept them in the order it found most effective, then a new mechanism for improvement of network efficiency would be at hand. Clearly this change would have an impact on BBN's IMP software.

2. Core-to-core transfers between HOSTS. At another level, perhaps not involving HOST-IMP protocol or IMP software changes, is a HOST-HOST protocol wherein cooperating HOSTS agree to lock appropriate programs in core for the duration of a multi-message file transfer on an auxiliary connection. This could greatly reduce the time to transfer such a file to or from a swap-bound HOST. Unfortunately, the numbers mitigate possible advantages of this approach to some extent: if we assume a 50 kilobit/sec line and suppose further that it is dedicated at 100% efficiency to this transfer (which may require slightly different handling of RFNMs in this case) this comes out to just over 6 8-kilobit messages per second. It may be impolitic in a timeshare environment to lock a single program in core for more than about 2 seconds. If this is the case, then the method would be applicable only for the rather limited range of file sizes of 2-16 messages. Nevertheless, the time to move a large file could be so greatly enhanced by this approach that I think it deserves consideration.

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